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EXAMINER

GOUDREAU, G

D1M1/1018

ART UNIT

PAPER NUMBER

17

GERALD J. FERGUSON, JR.
SIXBEY, FRIEDMAN, LEEDOM & FERGUSON
2010 CORPORATE RIDGE, SUITE 600
MCLEAN, VA 22102

1104

DATE MAILED:

10/18/93

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

- ☒ This application has been examined ☐ Responsive to communication filed on _____ ☐ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), _____ days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- | | |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited by Examiner, PTO-892. | 2. <input type="checkbox"/> Notice of Draftsman's Patent Drawing Review, PTO-948. |
| 3. <input checked="" type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449. | 4. <input type="checkbox"/> Notice of Informal Patent Application, PTO-152. |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474. | 6. <input type="checkbox"/> _____ |

Part II SUMMARY OF ACTION

1. ☒ Claims 16-30 are pending in the application.
Of the above, claims _____ are withdrawn from consideration.
2. ☒ Claims 1-15 have been cancelled.
3. ☐ Claims _____ are allowed.
4. ☒ Claims 16, 18-21, 23, 25-30 are rejected.
5. ☒ Claims 17, 22, 24 are objected to.
6. ☐ Claims _____ are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawings are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____, has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction, filed _____, has been ☐ approved; ☐ disapproved (see explanation).
12. ☒ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☒ been received ☐ not been received
☐ been filed in parent application, serial no. _____; filed on _____.
13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under 37 C.F.R. 1.102(b) and 1.103(b).

Art Unit 1104

15. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Evaluations of the level of ordinary skill in the art requires consideration of such factors as various prior art approaches, types of problems encountered in the art, rapidity with which innovations are made, sophistication of technology involved, educational background of those actively working in the field, commercial success, and failure of others.

The "person having ordinary skill" in this art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The evidence of record including the references and/or the admissions are considered to reasonably reflect this level of skill.

16. Claims 16, 18-21, 23, 30 are rejected under 35 U.S.C. § 103 as being unpatentable over Ivano~~V~~ et al. further in view of Maeda et al.

Ivano~~V~~ et al. disclose that it is desirable to plasma-CVD deposit a SiO₂ layer on a substrate using a gas comprised of

Art Unit 1104

TEOS, O_2 and a carrier gas such as N_2 . This is shown, and discussed in the abstract. Ivanor et al. fails, however to disclose the following aspects of applicant's claimed invention:

~ a plasma enhanced, photo - CVD process for depositing SiO_2 from TEOS and an oxidant such as O_2 .

Maeda et al. teach that is desirable to photo - CVD deposit a SiO_2 layer on a substrate using a gas comprised of TEOS, O_2 and a carrier gas such as N_2 . This is shown, and discussed in the abstract.

It would have been obvious to one skilled in the art to employ a plasma enhanced photo CVD process for depositing the SiO_2 layer in the process taught by Ivanor et al. based on Ex Parte Novak et al. ^oIn re Crockett as cited below.

[^]Ex Parte Novak (16 U.S.P.Q. 2046) states that is obvious to combine two old process steps for accomplishing the same goal into a single process.

In re Crockett 126 U.S.P.Q. 186 (CCPA) states that where the prior art teaches the use of two materials for the same purpose, it would be obvious to one of ordinary skill in the art to use the two materials in combination for the same purpose.

Thus, based on In re Crockett, and Ex Parte Novak, it would have been obvious to one skilled in the art to employ both types

of excitation sources (i.e. - plasma and photo) simultaneously to facilitate the deposition of a SiO_2 layer in Ivanov et al. since these simply represent two alternative and at least equivalent excitation means for promoting the CVD deposition of a SiO_2 layer from a process gas comprised of TEOS, and O_2 .

17. Claim 29 is rejected under 35 U.S.C. § 103 as being unpatentable over the reference as applied in paragraph 16 above further in view of Kedyarkin et al.

The references as applied in paragraph 16 above fail to disclose the following aspects of applicant's claimed invention:

-the use of liquid TEOS to form a SiO layer.

Kedyarkin et al. teach that it was known to deposit a SiO_2 layer using either a liquid or gaseous form of TEOS. This is discussed in the abstract.

It would have been obvious to one skilled in the art to replace the gaseous TEOS employed in paragraph 16 above with a liquid form based on the teachings of Kedyarkin et al. that a SiO_2 layer may alternatively and at least equivalently be formed using either a liquid or gaseous form of TEOS.

18. Claims 25-28 are rejected under 35 U.S.C. § 103 as being unpatentable over the reference as applied in paragraph 16 above further in view of Wolf.

The references discussed in paragraph 16 above fail to disclose the following aspects of applicant's claimed invention:

-the use of Al leads of the dimensions claimed by applicant as electrical contacts on the SiO_2 layer in the device disclosed in paragraph 16 above; and

-the use of a buffer layer or substrate barrier layer between the Al and the Si_2 ^{substrate} to prevent diffusion of the Al into the Si.

Wolf teaches that it is very common to form electrical leads (i.e. metal contacts) on semiconductor out of Al. He also teaches that it is conventional to use a barrier layer between the Al lead and Si substrate to prevent the undesirable diffusion of Al into the Si substrate. This is shown, and discussed on pages 110 to 131; and on pages 165-166.

It would have been obvious to one skilled in the art to employ Al contacts (i.e. - leads) in the structure taught in paragraph 16 above based on the teachings of Wolf that is conventional ~~or~~ at least well known to employ Al leads as conductors on semiconductors which would therefore render their usage on the structure taught in paragraph 16 obvious to one skilled in the art based on the teachings of Wolf. It would have further been obvious to one skilled in the art to employ a barrier layer (i.e. buffer layer) between the Al leads and the Si

Serial No. 971,242

-6-

Art Unit 1104

substrate in order to prevent the undesirable diffusion of Al into the Si based on the teachings of Wolf that it is desirable to do so.

It would have been prima facie obvious to construct the Al leads of a variety of dimensions including those claimed by the applicant. These are all well known variables, in the semiconductor art which are known to effect ~~both~~ the properties of the fabricated device. Further, the selection of particular values for these variables would simply involve routine experimentation and would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

19. Applicant needs to correct the errors in the specification which were pointed out by the Examiner in paper no. 2.

20. Claims 27-28 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-The use of the ~~term~~ "about" in claim 27 is vague and indefinite; and

-The use of the term "~~buffer~~ layer" in claim 28 is unconventional, and confusing.

Serial No. 971,242

-7-

Art Unit 1104

21. Claims 17, 22, 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. ~~Suzuki~~ et al. is cited of interest to the applicant.

They teach the use of a plasma enhanced, photo-CVD process to deposit SiO_2 from a gas comprised of TEOS, and O_2 .

23. In order to ensure full consideration of any amendments, affidavits or declarations, or other documents as evidence of patentability, such documents must be submitted in response to this Office action. Submissions after the next Office action, which is intended to be a final action, will be governed by the requirements of 37 C.F.R. § 1.116, which will be strictly enforced.

24 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner G. Goudreau whose telephone number is (703) 308-1915.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

George A. Goudreau
G. Goudreau:rg
September 15, 1993

T. Thomas
TOM THOMAS
PRIMARY EXAMINER
GROUP 1100